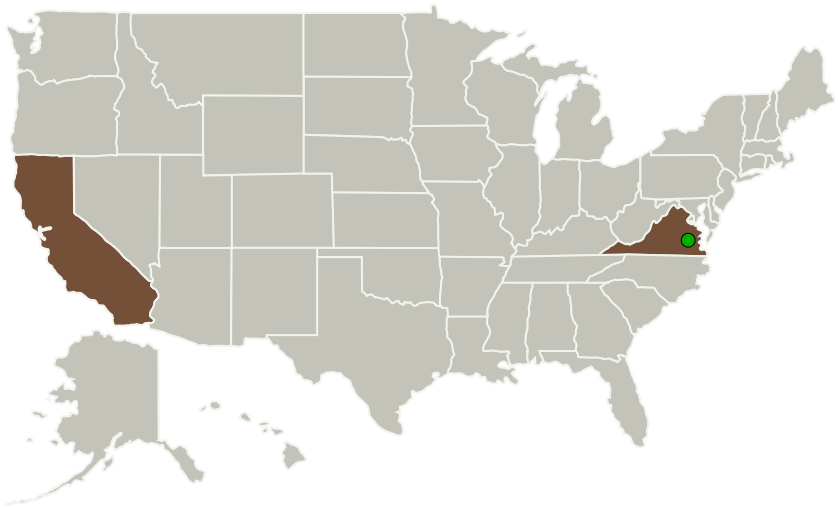
Statistical Decision Support Tools for System-Oriented Runway Management, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

The feasibility of developing a statistical decision support system for traffic flow management in the terminal area and runway load balancing was demonstrated in the Phase I research. The methodology employed an advanced estimation algorithm based on a queuing network model of the runway and the terminal area, and statistical decision theory to formulate traffic flow decisions. Radar data from the San Francisco terminal area was used in the feasibility demonstration. Component technologies developed in Phase I work can be used for synthesizing real-time statistical decision support tools for runway configuration management and arrival/departure scheduling. Phase II work will use the Phase I algorithms for developing decision support tools for NASA's System-Oriented Runway Management program elements. Queuing networks of runways, taxiways, gates, and terminal airspace will form the foundation of the decision support tool. Predicted demand, historic traffic data and real-time measurements will be combined in an estimator to generate the statistical distributions of the queuing network parameters. These will then be used in conjunction with methods from Statistical Decision Theory to generate actionable decisions. Phase II research will develop a software package implementing these algorithms, which can be evaluated in human-in-the-loop and operational settings during the Phase III work.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Optimal Synthesis, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Los Altos, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

June 2011: Project Start

May 2013: Closed out

Closeout Summary: Statistical Decision Support Tools for System-Oriented Runway Management, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137359)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Optimal Synthesis, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Padmanabhan K Menon

Co-Investigator:

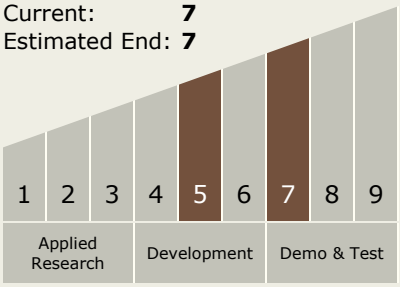
P. K Menon

Statistical Decision Support Tools for System-Oriented Runway Management, Phase II

Completed Technology Project (2011 - 2013)

Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System